

What is claimed is:

1. A process for integrating an alkene derivative process with an alkene process comprising the steps:
 - (a) reacting a hydrocarbon feedstock to produce alkene;
 - (b) reacting said alkene with oxygen and reactants to produce an alkene derivative;
 - (c) purifying said alkene derivative to produce a purified-alkene derivative segment and an unconverted segment;
 - (d) recovering and removing said purified-alkene derivative;
 - (e) removing waste gas from said unconverted segment to form a first portion of treated reactant segment and a second portion of unconverted reactant segment; and
 - (f) feeding said second portion of unconverted reactor segment of step (e) along with the feedstock of step (a) into an alkene process.
2. The process of claim 1 wherein the alkene derivative is ethylene derivative.
3. The process of claim 1 wherein the alkene derivative is propylene derivative.
4. The process of claim 2 wherein the ethylene derivative is ethylene oxide.

5. The process of claim 3 wherein the propylene derivative is propylene oxide.

6. The process of claim 1 wherein alkene is ethylene, the reactant in step (b) is acetic acid and the alkene derivative is vinyl acetate monomer.

7. The process of claim 1 wherein the undesirable gas in step (e) is carbon dioxide.

8. The process of claim 1 wherein the alkene derivative in step (b) contains alkene and at least one material selected from the group argon, methane, nitrogen, hydrogen, carbon dioxide and carbon monoxide.

9. The process of claim 1 wherein the hydrocarbon feedstock of step (a) comprises at least one material selected from the group consisting of ethane, propane, butane and naphtha.

10. The process of claim 1 wherein in step (e), the second portion of the unconverted reactant segment contains oxygen and removing said oxygen and then feeding the oxygen-free second portion of the unconverted reactant segment to the alkene process.

11. The process of claim 1 wherein said alkene process in step (a) comprises an in line coupling of cracking unit, quenching unit, first compressing unit, acid gas unit, second compressing unit, demethanization unit and product separation unit, and in step (e) feeding the second portion of the unconverted reactant

segment into the first compressing unit of the alkene process and treating the second portion along with the feedstock through said alkene process to produce the alkene.

12. The process of claim 11 wherein a stream from the demethanization unit contains hydrogen and at least one material selected from the group consisting of methane, carbon monoxide, argon and nitrogen, and feeding a portion of said stream back into the second portion of the unconverted reactant segment and then removing said components that are incompatible for use as feedstock in step (a).

13. The process of claim 12 wherein the product separation unit contains alkene and at least one material selected from the group consisting of ethane, propane and butane and separating said alkene and then using said alkene in step (b) to produce an alkene derivative.

14. The process of claim 10 wherein in step (e) comprises removing oxygen by chemical reaction with a hydrogen-based gas.

15. The process of claim 10 wherein in step (e) comprises adsorption by an adsorbent and oxygen removal.

16. The process of claim 1 wherein the process in step (a) comprises an in line coupling of cracking unit, quenching unit, first compressing unit, acid gas

unit, second compressing unit, demethanization unit and product separation unit.

17. The process of claim 1 wherein the process in step (e) comprises feeding the second portion of the unconverted reactant segment into the first compressing unit of the ethylene process and treating the second portion along with the feedstock through said ethylene process to produce the ethylene.

18. An apparatus for integrating an alkene derivative system with an alkene system comprising an alkene process having means for producing alkene from hydrocarbon feedstock and having means for discharging said alkene to a reactor unit; said reactor unit having means for producing an alkene derivative from oxygen, alkene from the alkene process and reactants and having means for discharging said alkene derivative to a product recovery unit; said product recovery unit having means for purifying and discharging said purified alkene derivative and having means for discharging unconverted reactants to a process gas treatment unit; said process gas treatment unit having means for removing undesirable gas from said unconverted reactants and having means for discharging a portion of the undesirable gas-free unconverted reactants to said reactor section and the remainder to a purge gas treatment unit; said purge gas treatment unit having means for removing components that are incompatible for use in the alkene process and having means for discharging the component-free unconverted reactants to the alkene process.

19. The apparatus of claim 18 whereby said alkene process comprises in line coupling of cracking unit, quenching unit, first compressing unit, acid gas unit, second compressing unit, demethanization unit and product separation unit.

20. The apparatus of claim 19 means for coupling the portion of the undesirable gas-free unconverted reactant from the process gas treatment unit to the purge gas treatment unit and wherein said purge gas treatment unit is a deoxo unit.